



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/701,534	11/30/2000	Shunichi Seki	107291	5481
25944	7590	02/01/2005	EXAMINER	
OLIFF & BERRIDGE, PLC			CLEVELAND, MICHAEL B	
P.O. BOX 19928			ART UNIT	
ALEXANDRIA, VA 22320			PAPER NUMBER	

1762

DATE MAILED: 02/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/701,534	Applicant(s) SEKI ET AL.	
	Examiner Michael Cleveland	Art Unit 1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 25-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 25-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 26-34 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no indication that Applicant had possession at the time of filing of the particular subgenus of all liquids which contain a cyclic silicon compound but not silylcyclopentasilane nor the particular subgenus of all liquids which contain a cyclic silicon compound but not any containing a silyl group, as recited in claims 26 and 27, respectively.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Art Unit: 1762

5. Claims 25-28 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yudasaka et al. (U.S. Patent 5,989,945, hereafter '945) in view of Eguchi et al. (U.S. Patent 4,683,147, hereafter '147).

Claims 25-27: '945 teaches a method for forming a silicon film for a device such as a thin film transistor (Abstract) comprising:

applying a coating solution (i.e., an ink composition) containing a silicon compound onto a substrate (col. 14, line 60-col. 16, line 16; Abstract) and evaporating the solvent to form a uniform film (col. 14, lines 4-12). Solutions may be deposited by ink-jet printing (col. 20, lines 35-40).

'945 does not teach that the silicon compound has a formula of Si_nX_{2n} . However, '146 teaches cyclic silanes that are used as silicon precursors (col. 1, lines 6-12) that are liquids at room temperature, such as Si_5F_{10} (col. 4, lines 56-60), which is not silylcyclopentasilane and contains no silyl groups. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted Si_5F_{10} as the silane precursors of '945 with the expectation of similar results and with a reasonable expectation of success because '146 demonstrates that it is useful as decomposable precursors to form silicon films.

Claim 28: The solution coating may take place under an inert atmosphere (col. 16, lines 29-31).

Claim 34: The silicon film may be crystallized by laser treating to form a crystalline film (col. 15, lines 6-26).

6. Claims 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yudasaka '945 in view of Eguchi '147 as applied to claim 27, and further in view of Kotaro et al. (JP 06-191821, hereafter '821).

'945 and '147 do not teach concentrations of the silane in the solution. Therefore, one of ordinary skill in the art would have been motivated to have looked to the related art to have determined operative concentrations. '821 teaches that the silane concentrations may be 0.1-50 % by weight. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have chosen a weight percent, such as 0.1 weight percent from within the

Art Unit: 1762

claimed range with a reasonable expectation of success because '821 demonstrates that such concentrations are operative for depositing such silanes.

'945 teaches the use of an alcohol solvent (col. 14, lines 4-12), but not a hydrocarbon with a vapor pressure at room temperature of 0.001-50 mmHg. However, '821 teaches other solvents that are suitable for depositing solution of silanes to form silicon films, such as ethylbenzene [0008], a hydrocarbon with a vapor pressure of approximately 10 mmHg at room temperature (See CRC Handbook of Chemistry and Physics, 47th edn., Weast, R.C., ed., p. D-125.) It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used ethylbenzene instead of an alcohol as the solvent with a reasonable expectation of success and with the expectation of similar results because '821 teaches that ethylbenzene is a suitable solvent for depositing such silanes.

7. Claims 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yudasaka '945 in view of Eguchi '147 as applied to claim 27, and further in view of Taniguchi et al. (U.S. Patent 5,667,572, hereafter '572).

'945 and '147 are described above, but do not explicitly teach using inks with the claimed viscosities or surface tensions. In fact, '945 is silent as to the viscosity and surface tension of the ink. Accordingly, one of ordinary skill in the art would have been motivated to have looked to the related prior art to determine operable viscosities and surface tensions for ink jet inks.

'572 teaches that ink jet inks (col. 1, lines 7-10) may usefully have viscosities of 1-10 cP and surface tensions of 25-70 dyn/cm (col. 9, lines 11-31). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used such values as the particular values of the viscosity and surface tension for the ink of '945 with a reasonable expectation of success because '572 teaches that such viscosities and surface tensions are useful in ink jet printing.

8. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yudasaka '945 in view of Eguchi '147 as applied to claim 27, and further in view of Van Mensvoort (U.S. Patent 4,753,822, hereafter '822).

Art Unit: 1762

'945 and '147 are described above, but do not explicitly teach irradiating light to the liquid before evaporation of the solvent (e.g., evaporating using light). However, '945 does teach that the solvent is evaporated (col. 14, lines 4-12). '822 teaches that the drying and decomposition of applied solutions of precursors, including silicon precursors (col. 2, lines 49-54) may be performed by irradiating with infrared light (col. 4, lines 32-35). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have dried the solution of '945 and '147 using infrared light with a reasonable expectation of success because '822 teaches that infrared light is useful for drying solutions of silicon precursors.

9. Claims 25-28 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yudasaka et al. (WO97/43689, hereafter '689) in view of Eguchi '147 for substantially the same reasons given above (WO97/43689 is the international application from which '945 matured.).

Claims 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yudasaka '689 in view of Eguchi '147 and Kotaro '821 for the same reasons given above relating to Yudasaka '945 in view of '147 and '821.

Claims 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yudasaka '689 in view of Eguchi '147 and Taniguchi '572 for the same reasons given above relating to Yudasaka '945 in view of '147 and '572.

Claims 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yudasaka '689 in view of Eguchi '147 and Van Mensvoort '822 for the same reasons given above relating to Yudasaka '945 in view of '147 and '822.

Double Patenting

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground

Art Unit: 1762

provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Note: Double patenting rejections based on the same patent with different secondary references have been grouped together under a single paragraph number.

11. Claims 26-29 and 34 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 4 of U.S. Patent No. 6,527,847 in view of Yudasaka '689. Claim 1 of '847 requires a silicon compound of the formula Si_nX_n and a solvent thereof (i.e., a liquid, and therefore an ink). As revealed by the specification, the formula covers polycyclic compounds without silyl groups (col. 4, lines 1-20). Therefore, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the overlapping portion of the genus disclosed by the reference because overlapping ranges have been held to be a *prima facie* case of obviousness, see *In re Malagari*, 182 U.S.P.Q. 549. Claim 4 of '847 teaches overlapping concentrations. '847 states that the composition is a coating composition, but the claims do not suggest a method of applying the composition. Yudasaka '689 teaches depositing silane coating compositions by ink-jet printing and teaches drying the solvent, as discussed above. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used ink-jet printing as the particular method of applying with a reasonable expectation of success because Yudasaka '689 teaches that ink-jet printing is a successful method of depositing silane precursors. The features of claims 28 and 34 have been discussed with regard to Yudasaka above.

Claim 30 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 4, 6, and 9 of U.S. Patent No. 6,527,847 in view of Yudasaka '689 and Kotaro '821 for the teachings of Kotaro regarding solvent characteristics discussed above.

Art Unit: 1762

Claims 31-32 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 4, 6, and 9 of U.S. Patent No. 6,527,847 in view of Yudasaka '689 and Taniguchi '572 for the teachings of Taniguchi regarding ink physical properties discussed above.

Claim 33 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 4, 6, and 9 of U.S. Patent No. 6,527,847 in view of Yudasaka '689 and Van Mensvoort '822 for the teachings of Van Mensvoort regarding infrared drying discussed above.

Response to Arguments

12. Applicant's arguments filed 12/16/2004 have been fully considered but they are not persuasive.

Applicant's arguments that the Yudasaka references do not teach precursors within the claimed genus are unconvincing because they do not address the combination of references. Precursors within the claimed genus are well known in the art. See, e.g., Eguchi '147, which teaches precursors of the genus of claims 25-27. (Eguchi '147 has been chosen instead of Hirai '146 because Hirai only teaches precursors of the groups of claims 26 and 27.)

Applicant's statements regarding Taniguchi and Kotaro individually are unconvincing because they do not address the combination of references.

Applicant argues that there is no motivation to combine Taniguchi with the other references. The argument is incorrect because the selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. Taniguchi is cited merely for its teachings regarding suitable surface tensions and viscosities for ink-jet inks.

Applicant argues that there is no motivation to combine Kotaro with the other references. The argument is incorrect because the selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. Kotaro is

Art Unit: 1762

cited merely for its teachings regarding suitable solvents and weight percents for solutions of such decomposable silanes.

Applicant argues that the formula of Matsuki does not overlap with claim 25. The argument is unconvincing regarding claims 26-34, which do not require the formula.

Applicant argues that there is no motivation to combine Yudasaka with the double patenting references. The argument is incorrect because the selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. Yudasaka is cited merely for its teachings regarding suitable method of using decomposable silanes.

The obviousness-type double patenting rejections based on U.S. Patent No. 6,503,570 are withdrawn in view of the new claims because the composition recited in '570, claim 1, is not included in any of independent claims 25-27.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Cleveland whose telephone number is (571) 272-1418. The examiner can normally be reached on Monday-Thursday, 7-5:30.

Art Unit: 1762

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Michael Cleveland
Primary Examiner
Art Unit 1762

1/26/2005